

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1-2. (CANCELLED).

3. (CURRENTLY AMENDED) A process for producing hydrogen by the intense thermal energy from thermochemical water splitting using iodine and sulfur dioxide, comprising:
~~wherein an~~ reacting a first aqueous solution containing iodine as a main component and ~~an a second~~ aqueous solution containing sulfur dioxide as a main component ~~are reacted~~ across a cation exchange membrane, ~~thereby concentrating to concentrate~~ the first aqueous solution until the a concentration of sulfuric acid ~~in it is~~ higher than ~~the value reported for the existing liquid-liquid separation method which is~~ H_2SO_4 to $4\text{H}_2\text{O}$ in terms of molar ratio.

4. (CANCELLED).

5. (NEW) A process for hydrogen production by thermochemical water splitting, which uses a reduced amount of iodine and water added to maintain a Bunsen reaction, the process comprising:

carrying out the Bunsen reaction in a reactor which is partitioned by a cation exchange membrane into a positive electrode portion and a negative electrode portion;

obtaining protons and an aqueous solution of sulfuric acid via a reaction of $\text{SO}_2 + 2\text{H}_2\text{O} = 2\text{H}^+ + \text{H}_2\text{SO}_4 + 2\text{e}^-$ in the positive electrode portion;

obtaining iodide ions via a reaction of $\text{I}_2 + 2\text{e}^- = 2\text{I}^-$ in the negative electrode portion;

obtaining an aqueous solution of hydrogen iodide via a reaction of the protons passing through the cation exchange membrane in the negative electrode portion, with the iodide ions;

producing hydrogen from the aqueous solution of hydrogen iodide, wherein

the aqueous solution of sulfuric acid obtained in the positive electrode portion after the Bunsen reaction is concentrated to be $\text{H}_2\text{SO}_4 + a\text{H}_2\text{O}$ where $a < 4$, and

the aqueous solution of hydrogen iodide obtained in the negative electrode portion after the Bunsen reaction is concentrated to be $2\text{HI} + b\text{I}_2 + c\text{H}_2\text{O}$, where $b < 8$ and $c < 11$, and having a

concentration in excess of a pseudo-azeotropic composition.